

In re Patent Application of:

FARRIES

Serial No. 09/886,998

Filed: 06/25/2001

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Amendments to the Claims

1. (Currently amended) An optical demultiplexer for demultiplexing an optical signal having a plurality of wavelength channels, wherein a centre wavelength of each of said channels is separated by a predetermined channel spacing, comprising:

(a) wavelength demultiplexing means for receiving the optical signal and for dividing the optical signal into a plurality of demultiplexed wavelength ~~bands~~ streams having a wavelength separation therebetween larger than the predetermined channel spacing and, wherein at least one of the demultiplexed wavelength ~~bands~~ streams has more than one wavelength channel for carrying data ~~information~~;

(b) time domain demultiplexing means for receiving one of the plurality of demultiplexed wavelength ~~bands~~ streams and for dividing the one of the plurality of wavelength ~~bands~~ streams into a plurality of time domain demultiplexed signals each comprising the plurality of wavelength ~~bands~~ streams; and

(c) optical filtering means for wavelength demultiplexing the time domain demultiplexed signals into separate wavelength channels.

2. (Original) The optical demultiplexer as defined in claim 1 further comprising splitting means for splitting the optical signal into at least two sub-signals before launching one of the sub-signals into the demultiplexing means.

3. (Original) The optical demultiplexer as defined in claim 2 further comprising clock recovery means for obtaining a clock signal from the one of the plurality of wavelength streams and for providing the clock signal to the time domain

In re Patent Application of:

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demultiplexing means for dividing the one of the plurality of wavelength streams into a plurality of time domain demultiplexed wavelength streams in dependence upon the clock signal.

4. (Original) The optical demultiplexer as defined in claim 3 comprising a plurality of time domain demultiplexing means and a plurality of optical filtering means, said plurality of time domain demultiplexing means for receiving the plurality of wavelength streams and for dividing the plurality of wavelength streams into a plurality of time domain demultiplexed wavelength streams, and each of said plurality of optical filtering means for demultiplexing each of the plurality of time domain demultiplexed wavelength streams into a single channel.

5. (Original) The optical demultiplexer as defined in claim 3 wherein a frequency spacing of the demultiplexing means is one of an integer multiple and a non-integer multiple of the predetermined channel spacing.

6. (Original) The optical demultiplexer as defined in claim 5 wherein the integer multiple is two.

7. (Original) The optical demultiplexer as defined in claim 6 wherein the demultiplexing means demultiplexes the optical signal according to a standardized International Telecommunications Union (ITU) frequency grid.

8. (Original) The optical demultiplexer as defined in claim 6 wherein the predetermined channel spacing is a frequency

In re Patent Application of:

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Serial No. 09/886,998

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spacing according to a standardized International Telecommunications Union (ITU) frequency grid.

9. (Original) The optical demultiplexer as defined in claim 6 wherein the time domain demultiplexing means is one of a lithium niobate (LiNbO_3) modulator and a semiconductor optical amplifier switch.

10. (Original) The optical demultiplexer as defined in claim 9 wherein the optical filtering means is a band-pass filter.

11. (Original) The optical demultiplexer as defined in claim 10 wherein the optical signal has a return to zero (RZ) modulation format.

12. (Original) The optical demultiplexer as defined in claim 5 wherein a sum of bit-rates of the plurality of time domain demultiplexed wavelength streams is equal to a bit-rate of the one of the plurality of wavelength streams.

13. (Previously presented) An optical demultiplexer for demultiplexing a multiplexed N channel optical signal comprising:

a splitter for splitting the multiplexed N channel optical signal into a plurality of multiplexed N channel optical sub-signals;

first wavelength demultiplexing means for coarse wavelength demultiplexing the plurality of multiplexed N channel optical sub-signals into M sub-signals, wherein at least one of the M sub-signals comprises more than one wavelength channel;

In re Patent Application of:

FARRIES

Serial No. 09/886,998

Filed: 06/25/2001

second time demultiplexing means for separating the M sub-signals which comprise more than one wavelength channel into R sub-signals, wherein the R sub-signals comprise the same wavelength channels; and

third demultiplexing means for wavelength demultiplexing the R sub-signals into N single channels.

14. (Original) The optical demultiplexer as defined in claim 13 further comprising clock recovery means for extracting a clock signal from the M sub-signals for demultiplexing the M sub-signals into the R sub-signals in dependence upon the clock signal.

15. (Currently amended) A method for demultiplexing a high bit-rate signal on a dense optical grid comprising the steps of:

providing the high bit-rate signal including a plurality of wavelength channels for carrying data ~~information~~ at a predetermined channel spacing to a coarse wavelength demultiplexer;

performing a coarse wavelength demultiplexing for dividing the high bit-rate signal into demultiplexed wavelength ~~bands~~ streams having a wavelength separation therebetween larger than the predetermined channel spacing and, wherein at least one of the demultiplexed wavelength ~~bands~~ streams has more than one wavelength channel for carrying data ~~information~~;

performing an optical time domain demultiplexing for dividing at least one of the demultiplexed wavelength ~~bands~~ streams into a plurality of time demultiplexed signals each comprising the plurality of wavelength ~~bands~~ streams; and

In re Patent Application of:

FARRIES

Serial No. 09/886,998

Filed: 06/25/2001

filtering at least one time demultiplexed signal through a wavelength filter for obtaining at least one individual wavelength channel.

16. (Currently amended) The method as defined in claim 15 further comprising the step of identifying a timing signal from the wavelength ~~bands~~ streams for performing an optical time domain demultiplexing for at least one of the wavelength ~~bands~~ streams in dependence upon the timing signal.

17. (Original) The method as defined in claim 15 further comprising the step of initially splitting the high bit-rate signal into at least two streams and providing each stream into a separate coarse wavelength demultiplexer of different but overlapping wavelength ranges.